

PATENT SPECIFICATION



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COMPLETE SPECIFICATION

Improvements in or relating to Fire Extinguishing Devices

I, PIERRE JEAN MARCHAUT, of 67, rue de Maubeuge, Paris, France, of French nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to devices for extinguishing fires by means of an extinguishing powder projected by an inert gas, such as carbon dioxide, the extinguishing material thus being constituted by a mixture of the said powder and gas. The invention is more particularly concerned with improved projectors for the extinguishers described and claimed in my patent of earlier date No. 426,525 in which the mixture of said powder and gas is discharged as a conical sheet.

According to the present invention there is provided in a fire extinguishing device adapted to project a conical sheet of extinguishing powder and gas, a projector comprising a member around the exterior of which the medium issues; guiding channels being formed on the exterior of said member through which the medium is constrained to pass, said channels being shaped so as to cause the medium to issue in a conical sheet when the member is in its initial position, said member being adapted for actuation so that the channels cause the cone-like sheet of material to close in and so reduce progressively the apex angle of the cone upon progressive actuation of said member for the purpose described herein.

Fire extinguishing devices have been proposed having nozzles adapted to project the extinguishing material in the form of a cone, such nozzles being fitted with stationary or rotary baffles to promote comminution and spreading of the extinguishing material. In apparatus for extinguishing fires by the conversion of carbon dioxide into snow it has been proposed to employ an outlet nozzle of conical shape provided with a similarly shaped plug so that there is the necessary sudden expansion of the carbon dioxide to convert it into snow. For the purpose of extinguishing sparks caused by the

action of the cutters of coal cutting machinery it has also been proposed to attach to the cutting tool a pipe from which water or other spark-extinguishing medium is projected around the cutting tool onto the coal face through an annular space which is formed between two relatively adjustable conically shaped members.

In the accompanying drawing which represents, by way of example, forms of construction of extinguishing devices embodying the present invention:

Figure 1 shows in elevation one form of the extinguishing device employing a projector according to the invention.

Figure 2 shows in section a projector adapted to distribute the extinguishing material in the form of a sheet with variable apex angle;

Figure 3 is a section on the line V—V of Figure 2;

Figure 4 shows a variation of the construction according to Figure 2, permitting automatic variation of the apex angle, and

Figure 5 shows diagrammatically another arrangement of the extinguishing device.

Figure 1 represents an extinguishing device comprising a reservoir 7 for the extinguishing powder in combination with a reservoir 8 for the inert gas under pressure, such as carbonic acid gas and connected by the piping 2 with the projector 1. This piping can be of any desired length sufficient to enable the person operating the apparatus, and carrying it for example by the reservoir 7, to bring the projector into a suitable position above the burning zone, without risk to himself.

Figures 2 and 3 show in detail a projector which can distribute the extinguishing material in the form of a conical sheet with variable apex angle. The nozzle 9 comprises a cylindrical exit orifice 16 in which can be displaced a core 17 having on its periphery channel elements 18 whose width diminishes from the face 19 at which the material arrives towards the opposite face 20, these channels forming directional mouthpieces 14

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and being formed to follow a helicoidal track on the periphery of the core 17, the pitch of the helix varying, being a maximum near the face 19 and a minimum near the face 20, as shown in Figure 2. The core 17 is connected to a stem 21 carrying, for example, a quick threaded screw 22 engaging in a nut 23 attached to the nozzle 9. An operating knob 24 enables the stem 21 to be rotated.

The functioning of the construction shown in Figures 2 and 3 is as follows:

If the core 17 is completely withdrawn into the orifice 16 of the nozzle, the extinguishing material arriving into this nozzle under suitable pressure enters the channels 18 at a high velocity which increases as a result of the reduced width of the channels. Each stream of material in escaping, maintains a direction tangential to the channel at its point of exit, that is to say, at the lower half of the orifice 16. It will thus be seen that, according to the position occupied by the core 17 in the cylindrical orifice 16, the streams guided by the channels 18 will have a direction more or less inclined to the vertical, thus forming a conical sheet with a variable apex angle. By operating the knob 24 the core 17 can be displaced, thus controlling the variation of this apex angle.

Referring to Figure 4, in the nozzle 9 of the projector is mounted a turbine wheel 25 mounted on a freely rotating spindle 26. When the extinguishing material under pressure passes through the nozzle, the wheel 25 which is stopped, and which, owing to its inertia, only gradually starts to rotate, acts at first as a fixed distributor in such a way that the streams passing out between the turbine vanes follow a direction indicated by the arrows *f*. Then, as the speed of rotation of the wheel increases, the direction of the streams becomes less and less inclined to the axis, thus causing the formation of a conical sheet with decreasing apex angle.

A suitable braking or retarding device, not shown in the drawing, may be arranged on the spindle 26 in accordance with the time necessary, suitably calculated, for the extinction of a burning zone, in such a way that the conical sheet which, at the commencement, has a maximum apex angle, only obtains its minimum apex angle at the end of a period in which the burning zone is completely extinguished.

Figure 5 shows diagrammatically another method of using the extinguishing device with the projector arranged to project a sheet substantially horizontally. In this case, the piping 2 (Figure 1) is not

required, further diminution of the zone encircled, over and above that due to the projector itself, being obtained by the approach of the projector, which is then attached directly to the reservoir 7, in the direction of the burning zone 5.

The invention permits, by the distribution of the extinguishing material in the form of a conical sheet, the formation of a sort of extinguishing shield, the conical sheet forming a wall which is virtually continuous, interrupting communication between the burning zone and the surrounding atmosphere, and thus preventing the air from furnishing the oxygen necessary for combustion. In addition, the gas constituent of the extinguishing material, being inert, also helps to impoverish the burning zone in combustible gas and, as a result, to accelerate its extinction.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a fire extinguishing device adapted to project a conical sheet of extinguishing powder and gas a projector comprising a member around the exterior of which the medium issues, guiding channels being formed on the exterior of said member through which the medium is constrained to pass, said channels being shaped so as to cause the medium to issue in a conical sheet when the member is in its initial position, said member being adapted for actuation so that the channels cause the cone-like sheet of material to close in and so reduce progressively the apex angle of the cone upon progressive actuation of said member, for the purpose described hereinbefore.

2. A fire-extinguishing device including a projector as claimed in Claim 1 wherein said member is provided with channels arranged in the form of a helix and whose pitch decreases towards one end, the exterior surface of said member being adapted to be masked, and the member being inmovable relative to the mask so that the channels are disclosed at their place of minimum pitch with respect to their helicoidal form, and advance of the member from its initial position in which only the part of the channels of minimum pitch is disclosed to the position in which the part of the channels of maximum pitch is disclosed corresponding to the maximum apex angle of the cone of the medium projected progressively to the minimum of the same.

3. A fire extinguishing device including a projector as claimed in Claim 1 or

2 wherein the channels are arranged to decrease in cross-sectional area towards that end where the pitch of the channels is a minimum.

5 4. A fire extinguishing device including a projector as claimed in Claim 1 wherein the member is rotatable and has channels of helical form, the medium
10 passing through said channels and being adapted to rotate the said member from its initial position of rest, in which the sheet of extinguishing medium is of cone-like form of maximum apex angle, and
15 by the revolution of the member to cause the said angle to diminish progressively in accordance with the increasing speed

of revolution, the member being restrained from free increase of speed of revolution by virtue of its own considerable mass or by restraining means.

5. Fire extinguishing devices constructed, arranged and adapted to operate substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 22nd day of February, 1934.

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Agents for the Applicant.

[This Drawing is a reproduction of the Original on a reduced scale.]

